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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/650,040	Applicant(s) BARTUR ET AL.	
	Examiner Natalie Lennox	Art Unit 2626	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *04 November 2007*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-39* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-39* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.

4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.

5) ☐ Notice of Informal Patent Application

6) ☐ Other: _____.

DETAILED ACTION

This Office Action has been issued in response to the amendments filed November 4, 2007. Claims 1-39 are pending with claim 27 amended.

Response to Arguments

1. Applicant's arguments, see Remarks page 9, 3rd paragraph, filed November 4, 2007, with respect to the rejection(s) of claim(s) 1, 9, and 27 under U.S.C. 35 102(b) have been fully considered and are persuasive. Therefore, the rejection has been withdrawn. However, upon further consideration, a new ground(s) of rejection is made in view of a different interpretation of the previously applied reference of Tzirkel-Hancock et al. and Hunter et al. (A Comparison of Schemas for Video Metadata Representation, 1999). Regarding claims 1 and 9, applicant argues Tzirkel-Hancock et al.'s failure of teaching active ranges, an active range storage unit, and a speech recognizer which determines a multiplicity of active ranges defining states to be processed for each frame. Examiner agrees with the applicant that Tzirkel-Hancock does not specifically teach the above discussed limitations, however, it would have been obvious to a person having ordinary skill in the art at the time of the invention that since the list of active states for a current frame includes the first active state and last active state for that current frame, the active range for that current frame, is included in the list of active states or could be determined from it. More specifically, the list of active states of Tzirkel-Hancock, as seen in Fig. 22, is an array of active states where the index 0 (i=0) points to the starting active state and the index 6 (i=6) points to the

ending active state, therefore the active range would be the range of states from S7 to S0. As per the "storage unit storing a multiplicity of active ranges," Tzirkel-Hancock does not specifically mention storing more than one active range per current frame. However, Hunter et al. teach a storage unit storing a multiplicity of active ranges (Section 4.3, Limitations of the RDF Schema for Video Metadata, 5th bullet. It is noted that Hunter et al. does not specifically mention that the ranges are active ranges, however, it would have been obvious to a person having ordinary skill in the art at the time of the invention that the range could be decided according to the design properties ("secs_start_time," as well as "per_cluster_range" or "from_previous_range"). It would have been obvious to a person having ordinary skill in the art at the time of the invention to have used the feature of a storage unit storing a multiplicity of active ranges as taught by Hunter et al. for Tzirkel-Hancock's system in order to provide flexibility in property choices that could be used in further processing like comparing results to provide for a better recognition method.

Regarding claim 27, applicant argues "Tzirkel-Hancock teaches processing only a list of active states. It does not show nor teach processing active ranges "defining states to be processed in a current frame." " However, as stated above, it would have been obvious to a person having ordinary skill in the art at the time of the invention that since the list of active states for a current frame includes the first active state and last active state for that current frame. The active range for that current frame is included in the list of active states or could be determined from it. More specifically, the list of

active states of Tzirkel-Hancock, as seen in Fig. 22, is an array of active states where the index 0 (i=0) points to the starting active state and the index 6 (i=6) points to the ending active state, therefore the active range would be the range of states from S7 to S0, wherein the states to be processed are included within the range.

Regarding claim 31, applicant argues "Tzirkel-Hancock does not teach "determining active ranges" because it teaches using a list of active states" (Remark's page 10, 2nd paragraph). However, as stated above, it would have been obvious to a person having ordinary skill in the art at the time of the invention that since the list of active states for a current frame includes the first active state and last active state for that current frame. The active range for that current frame is included in the list of active states or could be determined from it. More specifically, the list of active states of Tzirkel-Hancock, as seen in Fig. 22, is an array of active states where the index 0 (i=0) points to the starting active state and the index 6 (i=6) points to the ending active state, therefore the active range would be the range of states from S7 to S0.

2. Applicant's arguments filed November 4, 2007, regarding claim 31, have been fully considered, but they are not persuasive. Regarding claim 31, applicant argues "[Tzirkel-Hancock] does not teach "performing recognition operations for each said frame only on states within said active ranges" because it teaches away from recognition operations on any states not included in currently active list 203. The present specification allows inactive states to be included within active ranges"

(Remark's page 10, 2nd paragraph). Examiner respectfully disagrees with examiner because Tzirkel-Hancock's paragraph [0145] cites "there are seven active states in the current active list and the system processes them in turn" (Paragraph [0145], lines 13-14). Applicant's arguments regarding the present specification allowing inactive states to be included within the active ranges are directed to limitations found in the specification and not in the claims.

3. Applicant's arguments with respect to claims 17 and 22 have been considered but are moot in view of the new ground(s) of rejection.

Claim Rejections - 35 USC § 101

4. 35 U.S.C. 101 reads as follows:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

5. Claim 31 is rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter. Regarding claim 31, the method as claimed has no practical application given that it does not produce any useful, concrete, and tangible result. An example of a useful, concrete, and tangible result would be providing the results for the recognition operations on a display (display recognized utterance).

Claim Rejections - 35 USC § 103

6. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

7. Claims 1-6, 8-14, and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tzirkel-Hancock et al. (2002/0032566) in view of Hunter et al. (A Comparison of Schemas for Video Metadata Representation, 1999).

As per claim 1, Tzirkel-Hancock et al. teaches a speech recognition system comprising:

a reference library to store a plurality of reference words, each having a multiplicity of states (Paragraph [0003], In a limited vocabulary system, speech recognition is performed by comparing features of an unknown utterance with features of known words which are stored in a database (word model 19 of Fig. 2), also Paragraph [0141], Fig. 22 shows an example word model 201 which comprises a sequence of states So to S9 derived during a training session, and an exit state SD at the end of the word model); and

a speech recognizer to match an input signal to one of said plurality of reference words, said speech recognizer having an active range storage unit to store an active range defining said states on whom recognition operations are to be performed for a current frame (Paragraph [0068] (speech recognizer) and paragraph [0142] where the word model 201 also has associated therewith a current active list 203 for the current frame. It is noted that Tzirkel-Hancock does not specifically mention an active range, however, it would have been obvious to a person having ordinary skill in the art at the

time of the invention that since the list of active states for a current frame includes the first active state and last active state for that current frame, the active range for that current frame, is included in the list of active states or could be determined from it. More specifically, the list of active states of Tzirkel-Hancock, as seen in Fig. 22, is an array of active states where the index 0 (i=0) points to the starting active state and the index 6 (i=6) points to the ending active state, therefore the active range would be the range of states from S7 to S0.).

However, Tzirkel-Hancock et al. does not specifically mention

a storage unit to store a multiplicity of active ranges.

Conversely, Hunter et al. teach

a storage unit to store a multiplicity of active ranges (Section 4.3, Limitations of the RDF Schema for Video Metadata, 5th bullet. It is noted that Hunter et al. does not specifically mention that the ranges are active ranges, however, it would have been obvious to a person having ordinary skill in the art at the time of the invention that the range could be decided according to the design properties ("secs_start_time," as well as "per_cluster_range" or "from_previous_range").

It would have been obvious to a person having ordinary skill in the art at the time of the invention to have used the feature of a storage unit storing a multiplicity of active ranges as taught by Hunter et al. for Tzirkel-Hancock's system in order to provide flexibility in property choices that could be used in further processing like comparing results to provide for a better recognition method.

As per claim 9, Tzirkel-Hancock et al. teach the speech recognition system comprising:

a reference library to store a plurality of reference words, each having a multiplicity of states (Paragraph [0003], In a limited vocabulary system, speech recognition is performed by comparing features of an unknown utterance with features of known words which are stored in a database (word model 19 of Fig. 2), also Paragraph [0141], Fig. 22 shows an example word model 201 which comprises a sequence of states S0 to S9 derived during a training session, and an exit state SD at the end of the word model); and

a speech recognizer to match an input signal to one of said plurality of reference words, said speech recognizer having an active range storage unit to store an active range defining said states on whom recognition operations are to be performed for a current frame (Paragraph [0068] (speech recognizer) and paragraph [0142] where the word model 201 also has associated therewith a current active list 203 for the current frame. It is noted that Tzirkel-Hancock does not specifically mention an active range, however, it would have been obvious to a person having ordinary skill in the art at the time of the invention that since the list of active states for a current frame includes the first active state and last active state for that current frame, the active range for that current frame, is included in the list of active states or could be determined from it. More specifically, the list of active states of Tzirkel-Hancock, as seen in Fig. 22, is an array of active states where the index 0 (i=0) points to the starting active state and the

index 6 (i=6) points to the ending active state, therefore the active range would be the range of states from S7 to S0.).

However, Tzirkel-Hancock et al. does not specifically mention

a storage unit to store a multiplicity of active ranges.

Conversely, Hunter et al. teach

a storage unit to store a multiplicity of active ranges (Section 4.3, Limitations of the RDF Schema for Video Metadata, 5th bullet. It is noted that Hunter et al. does not specifically mention that the ranges are active ranges, however, it would have been obvious to a person having ordinary skill in the art at the time of the invention that the range could be decided according to the design properties ("secs_start_time," as well as "per_cluster_range" or "from_previous_range").

It would have been obvious to a person having ordinary skill in the art at the time of the invention to have used the feature of a storage unit storing a multiplicity of active ranges as taught by Hunter et al. for Tzirkel-Hancock's system in order to provide flexibility in property choices that could be used in further processing like comparing results to provide for a better recognition method.

As per claims 2 and 10, Tzirkel-Hancock et al., in view of Hunter et al., teach the speech recognition system according to claims 1 and 9, having at least one active range per reference word (Fig. 22 shows word model 201 and active list 203 having 7 active ranges for the reference word model 201.).

As per claims 3 and 11, Tzirkel-Hancock et al., in view of Hunter et al., teach the speech recognition system according to claims 2 and 10, wherein each said active range has a start state and an end state and wherein said start state is the first state to be processed in said word for said current frame and said end state is the last state to be processed in said current frame (Paragraph [0143], Fig. 23 shows seven valid paths pl to p7 which represent seven possible matching between the incoming word and the word model 201 up to the current frame fk. As shown, the seven valid paths pl to p7 end at word model 201 states s7, s5, s4, s3, s2, s1 and So respectively, and it is these end states of the valid paths that are listed, in descending order, in the current active list 203. It is inherent from Fig. 23 that each of the end states s7, s5, s4, s3, s2, s1 and s0 have a starting state associated with them and as can be seen in Fig. 23, for example, for end state S7, there is a starting state s4 associated with it, and end state s5 has starting state s2 associated with it, and so on.).

As per claims 4 and 12, Tzirkel-Hancock et al., in view of Hunter et al., teach the speech recognition system according to claims 2 and 10, wherein each said active range minimally comprises the active states within said reference word (Paragraph [0142], The word model 201 also has associated therewith a current active list 203 for the current frame fk which lists, in descending order, the states in the word model that are at the end of a valid path for the current frame fk. Therefore, each state in the current active list 203 will store the cumulative distance of the valid path that ends at that state.).

As per claims 5 and 13, Tzirkel-Hancock et al., in view of Hunter et al., teach the speech recognition system according to claims 4 and 12, wherein each said active range also comprises at least one inactive state not able to become active in said current frame (Fig. 23 shows state 6 of word model 201 which is inactive and is not able to become active in frame fk.).

As per claims 6 and 14, Tzirkel-Hancock et al., in view of Hunter et al., teach the speech recognition system according to claims 1 and 9, and wherein said speech recognizer comprises an active range updater to determine the beginning and end of each of said active ranges (active range updater-new active list 205 from Fig. 22, Paragraph [0146] states that once all the active states on the current active list 203 have been processed, the new active list 205 generated during the processing in step s77 (from Fig. 24) is changed, in step s83, to be the current active list 203 for the next frame fk of the input utterance to be processed. Paragraph [0147] gives an overview of the processing performed in step s77 using as examples active states sT and s5, which are the ends of paths pl and p2 respectively, as shown in Fig. 23. Fig. 25 shows part of the two valid paths p I and p2 that end at states s7 and s5 respectively at the current frame fk. The dashed lines in Fig. 25 show the ways in which each of the two paths pl and p2 may propagate at the next frame fk. Therefore, the cumulative distance of path p I (which is stored in active state s7) is copied into the exit state S0. As indicated by dashed lines 215, 217 and 219 path p I can also propagate to state s9, state s8 and state s7 respectively. Therefore, the cumulative distance of path p1 is also copied into

these states. States s9, s8 and s7 are then added, in descending order, to the new active list 205.).

As per claims 8 and 16, Tzirkel-Hancock et al., in view of Hunter et al., teach the speech recognition system according to claims 1 and 9, comprising a state buffer storing all of said states in a fixed order and their active/inactive status (state buffer-current active list 203, Paragraph [0142] states that [t]he word model 201 also has associated therewith a current active list 203 for the current frame fk which lists, in descending order, the states in the word model that are at the end of a valid path for the current frame fk. Therefore, each state in the current active list 203 will store the cumulative distance of the valid path that ends at that state).

8. Claims 22-36 and 39 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tzirkel-Hancock et al. (US 2002/0032566).

As per claim 22, Tzirkel-Hancock et al. teach an active range pruner comprising:

means for retrieving active ranges for a current frame (Paragraph [0142] where the word model 201 also has associated therewith a current active list 203 for the current frame. It is noted that Tzirkel-Hancock does not specifically mention an active range, however, it would have been obvious to a person having ordinary skill in the art at the time of the invention that since the list of active states for a current frame includes the first active state and last active state for that current frame, the active range for that current frame, is included in the list of active states or could be determined from it.

More specifically, the list of active states of Tzirkel-Hancock, as seen in Fig. 22, is an array of active states where the index 0 (i=0) points to the starting active state and the index 6 (i=6) points to the ending active state, therefore the active range would be the range of states from S7 to S0, wherein the states to be processed are included within the range.); and

means for performing pruning operations only on states within said active ranges (Step S77 from Fig. 24, Step S91 from Fig. 27a, and Paragraph [0152]).

As per claim 27, Tzirkel-Hancock et al. teach a speech recognition system having a data structure, the data structure comprising:

a multiplicity of active ranges, each active range defining states to be processed by said speech recognition system in a current frame and each active range comprising (Paragraph [0068] (speech recognizer) and paragraph [0142] where the word model 201 also has associated therewith a current active list 203 for the current frame. It is noted that Tzirkel-Hancock does not specifically mention an active range, however, it would have been obvious to a person having ordinary skill in the art at the time of the invention that since the list of active states for a current frame includes the first active state and last active state for that current frame, the active range for that current frame, is included in the list of active states or could be determined from it. More specifically, the list of active states of Tzirkel-Hancock, as seen in Fig. 22, is an array of active states where the index 0 (i=0) points to the starting active state and the index 6 (i=6)

points to the ending active state, therefore the active range would be the range of states from S7 to S0, wherein the states to be processed are included within the range.);

a beginning state of said active range, wherein said beginning state is the first active state (Fig. 22 is an array of active states where the index 0 (i=0) points to the starting active state and the index 6 (i=6) points to the ending active state, therefore the active range would be the range of states from S7 to S0); and

an end state of said active range, where said end state is the last state able to become active in said current frame (Fig. 22 is an array of active states where the index 0 (i=0) points to the starting active state and the index 6 (i=6) points to the ending active state, therefore the active range would be the range of states from S7 to S0).

As per claim 31, Tzirkel-Hancock et al. teach the method of recognizing speech, the method comprising:

determining active ranges for each frame to be processed (Paragraph [0142], The word model 201 also has associated therewith a current active list 203 for the current frame. It is noted that Tzirkel-Hancock does not specifically mention an active range, however, it would have been obvious to a person having ordinary skill in the art at the time of the invention that since the list of active states for a current frame includes the first active state and last active state for that current frame, the active range for that current frame, is included in the list of active states or could be determined from it. More specifically, the list of active states of Tzirkel-Hancock, as seen in Fig. 22, is an array of active states where the index 0 (i=0) points to the starting active state and the

index 6 (i=6) points to the ending active state, therefore the active range would be the range of states from S7 to S0.); and

performing recognition operations for each said frame only on states within said active ranges (Paragraph [0145], lines 13-14, wherein it would have been obvious to a person having ordinary skill in the art at the time of the invention that since the list of active states for a current frame includes the first active state and last active state for that current frame, the active range for that current frame, is included in the list of active states or could be determined from it.).

As per claim 23, Tzirkel-Hancock et al. teach the system according to claim 22, and having at least one active range per reference word (Tzirkel-Hancock et al.'s Fig. 22 shows word model 201 and active list 203 having 7 active ranges for the reference word model 201).

As per claim 24, Tzirkel-Hancock et al. teach the system according to claims 23, wherein each said active range has a start state and an end state and wherein said start state is the first state to be processed in said word for said current frame and said end state is the last state to be processed in said current frame (Tzirkel-Hancock et al.'s Paragraph [0152]).

As per claim 25, Tzirkel-Hancock et al. teach the system according to claim 23, wherein each said active range minimally comprises the active states within said

reference word (Tzirkel-Hancock et al.'s Paragraph [0142], The word model 201 also has associated therewith a current active list 203 for the current frame fk which lists, in descending order, the states in the word model that are at the end of a valid path for the current frame fk. Therefore, each state in the current active list 203 will store the cumulative distance of the valid path that ends at that state.).

As per claim 26, Tzirkel-Hancock et al. teach the system according to claim 25, also comprising at least one inactive state not able to become active in said current frame (Tzirkel-Hancock et al.'s Fig. 23 shows state 6 of word model 201 which is inactive and is not able to become active in frame fk.).

As per claims 28 and 32, Tzirkel-Hancock et al. teach the speech recognition system according to claim 27 and a method for recognizing speech according to claim 31, having at least one active range per reference word (Fig. 22 shows word model 201 and active list 203 having 7 active ranges for the reference word model 201.).

As per claim 33, Tzirkel-Hancock et al. teach the method of recognizing speech according to claim 32, wherein each said active range has a start state and an end state and wherein said start state is the first state to be processed in said word for said current frame and said end state is the last state to be processed in said current frame (Paragraph [0143], Fig. 23 shows seven valid paths pl to p7 which represent seven possible matching between the incoming word and the word model 201 up to the

current frame fk. As shown, the seven valid paths pl to p7 end at word model 201 states s7, s5, s4, s3, s2, s1 and So respectively, and it is these end states of the valid paths that are listed, in descending order, in the current active list 203. It is inherent from Fig. 23 that each of the end states s7, s5, s4, s3, s2, s1 and s0 have a starting state associated with them and as can be seen in Fig. 23, for example, for end state S7, there is a starting state s4 associated with it, and end state s5 has starting state s2 associated with it, and so on.).

As per claims 29 and 34, Tzirkel-Hancock et al. teach the speech recognition system according to claim 28, and the method of recognizing speech according to claim 32, wherein each said active range minimally comprises the active states within said reference word (Paragraph [0142], The word model 201 also has associated therewith a current active list 203 for the current frame fk which lists, in descending order, the states in the word model that are at the end of a valid path for the current frame fk. Therefore, each state in the current active list 203 will store the cumulative distance of the valid path that ends at that state.).

As per claims 30 and 35, Tzirkel-Hancock et al. teach the speech recognition system according to claim 29, and the method of recognizing speech according to claim 34, wherein each said active range also comprises at least one inactive state not able to become active in said current frame (Fig. 23 shows state 6 of word model 201 which is inactive and is not able to become active in frame fk.).

As per claim 36, Tzirkel-Hancock et al. teach the method of recognizing speech according to claim 31, said determining comprises determining the beginning and end of each of said active ranges (Paragraph [0145] states that [i]n step s73 (of Fig. 24) the system then checks to see if there are any active states in the current active list 203. In other words, a check is made to see if there are any valid paths ending in the current word for the current frame fk. Also as stated in paragraph [0143] the seven valid paths pl to p7 (as shown in Fig. 23) end at word model 201 states sz, s5, s4, s3, s2, sl and So respectively, and it is these end states of the valid paths that are listed, in descending order, in the current active list 203. It is inherent, from Fig. 23, that each valid path or "active range" has a beginning and an end, for example for active state s7 on the current active list 203, s7 represents the end state or "end of active range" of valid path 1 (referred to as pl in Fig. 23) and s4 represents the beginning or "start state" of valid path 1. As another example, active state s5 on the current active list 203, represents the end state of valid path 2 (p2) and s2 represents the start state of valid path 2.).

As per claim 39, Tzirkel-Hancock et al. teach the method of recognizing speech according to claim 31, comprising a state buffer storing all of said states in a fixed order and their active/inactive status (state buffer-current active list 203, Paragraph [0142] states that [t]he word model 201 also has associated therewith a current active list 203 for the current frame fk which lists, in descending order, the states in the word model that are at the end of a valid path for the current frame fk. Therefore, each state in the

current active list 203 will store the cumulative distance of the valid path that ends at that state).

9. Claims 17-21, 37, and 38 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tzirkel-Hancock et al. (US 2002/0032566) in view of Setlur et al. (US Patent 5,956,675)

As per claim 17, Tzirkel-Hancock et al. teach an active range Viterbi calculator comprising:

means for retrieving active ranges for a current frame (Paragraph [0142] where the word model 201 also has associated therewith a current active list 203 for the current frame. It is noted that Tzirkel-Hancock does not specifically mention an active range, however, it would have been obvious to a person having ordinary skill in the art at the time of the invention that since the list of active states for a current frame includes the first active state and last active state for that current frame, the active range for that current frame, is included in the list of active states or could be determined from it. More specifically, the list of active states of Tzirkel-Hancock, as seen in Fig. 22, is an array of active states where the index 0 (i=0) points to the starting active state and the index 6 (i=6) points to the ending active state, therefore the active range would be the range of states from S7 to S0, wherein the states to be processed are included within the range.).

However, Tzirkel-Hancock et al. do not specifically mention

means for performing Viterbi calculations only on states within said active ranges.

Conversely, Setlur et al. teach

means for performing Viterbi calculations only on states within said active ranges (Col. 4, lines 52-57).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have used the feature of means for performing Viterbi calculations only on states within said active ranges as taught by Setlur et al. for Tzirkel-Hancock et al.'s system because Setlur et al. uses the Viterbi algorithm for obtaining likelihood scores of the extracted features of an utterance (word sequence input) compared with the word model in order to obtain the most likely word sequence corresponding to the utterance (Col. 4, lines 61-63).

As per claim 18, Tzirkel-Hancock et al., in view of Setlur et al., teach the system according to claim 17 and having at least one active range per reference word (Tzirkel-Hancock et al.'s Fig. 22 shows word model 201 and active list 203 having 7 active ranges for the reference word model 201.).

As per claim 19, Tzirkel-Hancock et al., in view of Setlur et al., teach the system according to claim 18, wherein each said active range has a start state and an end state and wherein said start state is the first state to be processed in said word for said

current frame and said end state is the last state to be processed in said current frame (Tzirkel-Hancock et al.'s Paragraph [0152]).

As per claim 20, Tzirkel-Hancock et al., in view of Setlur et al., teach the system according to claim 18, wherein each said active range minimally comprises the active states within said reference word (Tzirkel-Hancock et al.'s Paragraph [0142], The word model 201 also has associated therewith a current active list 203 for the current frame fk which lists, in descending order, the states in the word model that are at the end of a valid path for the current frame fk. Therefore, each state in the current active list 203 will store the cumulative distance of the valid path that ends at that state.).

As per claim 21, Tzirkel-Hancock et al., in view of Setlur et al., teach the system according to claim 20, also comprising at least one inactive state not able to become active in said current frame (Tzirkel-Hancock et al.'s Fig. 23 shows state 6 of word model 201 which is inactive and is not able to become active in frame fk.).

As per claim 37, Tzirkel-Hancock et al. teach the method according to claim 31, but doesn't specifically mention wherein said performing comprises performing Viterbi calculations.

Conversely, Setlur et al. teach

said performing comprises performing Viterbi calculations (Col. 4, lines 52-57).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have used the feature of means for performing Viterbi

calculations only on states within said active ranges as taught by Setlur et al. for Tzirkel-Hancock et al.'s system because Setlur et al. uses the Viterbi algorithm for obtaining likelihood scores of the extracted features of an utterance (word sequence input) compared with the word model in order to obtain the most likely word sequence corresponding to the utterance (Col. 4, lines 61-63).

As per claim 38, Tzirkel-Hancock et al., as modified by Setlur et al., teach the method according to claim 37, wherein said performing comprises reviewing the output of said performing Viterbi calculations and marking states within said active ranges as active or inactive (Setlur's Col. 4, lines 55-61, wherein the pruned unlikely word sequences are the inactive states, which are not stored on the updated active word list).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have used the feature of reviewing the output of said performing Viterbi calculations and marking states within said active ranges as active or inactive as taught by Setlur et al. for Tzirkel-Hancock et al.'s system because Setlur et al. prunes the inactive states (unlikely word sequences) in order to provide at the end the most likely word sequence corresponding to the utterance (Col. 4, lines 58-63).

10. Claims 7 and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tzirkel-Hancock et al. (US 2002/0032566) in view of Hunter et al. (A Comparison of Schemas for Video Metadata Representation, 1999) as applied to claims 1 and 9 above, and further in view of Setlur et al. (US 5,956,675).

As per claims 7 and 15, Tzirkel-Hancock et al., in view of Hunter et al., teach the speech recognition system according to claims 1 and 9, wherein said speech recognizer comprises an active range pruner to process states within said active range (Tzirkel-Hancock's Step S77 from Fig. 24, Step S91 from Fig. 27a, and Paragraph [0152]).

However, Tzirkel-Hancock et al., as modified by Hunter et al., does not specifically mention an active range Viterbi calculator to process states within said active ranges.

Conversely, Setlur et al. teach

an active range Viterbi calculator to process states within said active ranges (Col. 4, lines 52-57).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have used the feature of means for performing Viterbi calculations only on states within said active ranges as taught by Setlur et al. for Tzirkel-Hancock et al.'s system, as modified by Hunter et al., because Setlur et al. uses the Viterbi algorithm for obtaining likelihood scores of the extracted features of an utterance (word sequence input) compared with the word model in order to obtain the most likely word sequence corresponding to the utterance (Col. 4, lines 61-63).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Natalie Lennox whose telephone number is (571) 270-

1649. The examiner can normally be reached on Monday to Friday 9:30 am - 7 pm (EST).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Richemond Dorvil can be reached on (571)272-7602. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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NL 02/01/2008

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